REMARKS

Applicant respectfully requests reconsideration. Claims 1, 7, 13 and 91-96 were pending in the application. These claims remain pending for examination with claim 1 being the sole independent claim.

Rejection of Claim 1

Claims 1, 7,13, 91, 92 and 93 were rejected as being anticipated by U.S. Patent No. 6,232,264 (Lukehart patent).[1]

In the last response, Applicant argued that Lukehart fails to teach using PtPb in any form as a catalyst, much less using an ordered intermetallic PtPb in a system that oxidizes a fuel selected from the group consisting of formic acid, methanol, ethanol and ethylene glycol as claimed. The previous Office Action had relied on description in the "Background of Invention" in the Lukehart patent which refers to previous work that studied PtPb as a catalyst and cites a number of references (column 4, lines 23-27). After studying the Lukehart patent and these references, Applicant concluded that "PtPb" in this text was a typographical error that should have read "PtPd". At that time, Applicant contacted Professor Charles Lukehart (inventor from the Lukehart patent) and Vanderbilt University (assignee of the Lukehart patent) to discuss this issue. Professor Lukehart confirmed that the use of "PtPb" was a typographical error and that the text should have read "PtPd". A Certificate of Correction had been filed in connection with the Lukehart patent to correct this typographical error which was enclosed in the last response.

This present Office Action refers to the journal article of Hamnett as being the relevant reference described in the "Background of Invention" in Lukehart. However, Hamnett teaches a **platinum electrode surface modified with Pb atoms** (as well as Au, Sn atoms), rather than an **ordered intermetallic PtPb compound** as claimed. As noted in the present application, an ordered intermetallic compound refers to "compounds that comprise more than one metal and have an ordered atomic structure" (page 7, lines 1-2). The present application further states that "in an ordered intermetallic compound, substantially all unit cells include the same arrangement of metal

[1] In paragraph 6 of the Office Action, only claim 1 is indicated as being rejected in view of the Lukehart patent. However, in subsequent paragraphs related to this rejection, the Office Action refers to claims 7, 13, 91, 92 and 93. Therefore, Applicant assumes that all of these claims stand rejected in view of the Lukehart patent on this ground.

atoms" (page 7, lines 2-4) which explains why the catalytic properties of such compounds can be so high (e.g., page 7, line 28 – page 8, line 3). The surface modified electrode in Hamnett is not even a compound, since it is formed of a single metal (i.e., Pt), let alone an intermetallic compound. The Pb atoms are only present on the surface and, thus, the composition of such an electrode is inherently unstable and changes over time, for example, as atoms desorb from, or migrate, on the surface. In contrast, the composition of an ordered intermetallic compounds is fixed at the atomic scale and highly stable which allows its excellent catalytic properties to be maintained over time (page 8, lines 18-19). The lack of order and instability of the composition of the surface-modified Pt electrode in Hamnett would cause that material to behave significantly different than the claimed ordered intermetallic compound. Thus, Hamnett (and, consequently, Lukehart) falls far short of teaching, or making obvious, a **PtPb ordered intermetallic compound** as recited in claim 1.

Claim 1 also recites that the catalyst, which comprises the ordered intermetallic compound PtPb, oxidizes a fuel in the catalytic system selected from the group consisting of formic acid, methanol, ethanol and ethylene glycol. There is no mention whatsoever in Lukehart (or Hamnett, or any other reference) of using an ordered intermetallic PtPb as a catalyst to oxidize these specific fuels. Moreover, the catalytic activity of ordered intermetallic PtPb for the oxidation of formic acid, methanol, ethanol and ethylene glycol is exceptionally high and entirely unexpected. The declarations submitted with the response filed on October 4, 2006 set forth the exceptional catalytic properties (also described in the application) of ordered intermetallic PtPb when oxidizing the fuels recited in claim 1. As noted in the declarations, these properties are entirely unexpected and lead to significant advantages over conventional catalytic materials with respect to these fuels. Such unexpectedly good results are evidence of the non-obviousness of the specific combination of catalyst and fuels recited in claim 1.

For these reasons, claim 1 is both novel and non-obvious in view of the Lukehart patent. The remaining claims that stand rejected on this ground depend from claim 1 and are patentable over the Lukehart patent for at least this reason. Accordingly, Applicant respectfully requests withdrawal of the rejections on this ground.

Rejection of Claims 94 and 96

Claims 94 and 96 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lukehard as applied to claim 1 above and further in view of U.S. Patent No. 2002/0102451 (Acker).

Claims 94 and 96 depend from claim 1 which is patentable over the Lukehart patent for reasons noted above. Acker also fails to teach or suggest using an ordered intermetallic PtPb compound as a catalyst. Therefore, even if the Lukehart patent is combined with the Acker patent, such combination fails to teach or suggest each feature of claim 1 and, thus, dependent claims 94 and 96.

As described above, the declarations submitted with the response filed on October 4, 2006 set forth the exceptional catalytic properties (also described in the application) of ordered intermetallic PtPb when oxidizing the fuels recited in claim 1. Such unexpectedly good results are further evidence of the non-obviousness of the specific combination of catalyst and fuels recited in the claims.

Accordingly, Applicant respectfully requests withdrawal of the claim rejections on this ground.

Rejection of Claim 95

Claim 95 was rejected under 35 U.S.C. §103(a) as being unpatentable over Lukehard as applied to claim 1 above and further in view of U.S. Patent No. 7,141,322 (Qi).

Claim 95 depends from claim 1 which is patentable over the Lukehart patent for reasons noted above. The Qi patent also fails to teach or suggest using an ordered intermetallic PtPb compound as a catalyst. Therefore, even if the Lukehart patent is combined with the Qi patent, such combination fails to teach or suggest each feature of claim 1 and, thus, dependent claim 95.

As described above, the declarations submitted with the response filed on October 4, 2006 set forth the exceptional catalytic properties (also described in the application) of ordered intermetallic PtPb when oxidizing the fuels recited in claim 1. Such unexpectedly good results are further evidence of the non-obviousness of the specific combination of catalyst and fuels recited in the claims.

Accordingly, Applicant respectfully requests withdrawal of the claim rejection on this ground.

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Respectfully submitted,

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